



# ***CSTAR Program: Collaborative Science, Technology, and Applied Research***

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# Background



## Program for NWS/university collaborative research consisting of:

- Fully competitive, applied research grant program started in 2000
- 1 to 3 year studies--maximum funding level \$125K per year
- Objective: To improve NWS forecast and warning services by exploiting S&T improvements to the fullest
- Applied research and education projects involving collaboration between NWS forecasters and university experts
- Proposals must address national, regional or NCEP-related science needs/priorities
- Priority given to proposals that have the potential to be expanded nationally through the Operational Proving Ground



# CSTAR Benefits



## Forecast and Warning Improvement – high-impact events

- Accelerated transition of research to operations through NWS WFO's/RFC's...NCEP...NWS Testbeds and OPG

## Leveraging Resources

- Value of engaging world-class researchers, professors, graduate students at academic institutions far exceeds cost
- Excellent student recruiting tool for university recipients
- Dozens of CSTAR “alumni” have been subsequently employed by NOAA

6th NOAA Testbeds and Proving Grounds Workshop, April 14-16, 2015



# Ongoing CSTAR Award Status



## 6 Projects awarded from FY13 FFO

- University of Oklahoma – PI Ming Xie (+3 others)
- SUNY Stony Brook – PI's Colle and Chang
- University of Utah – PI's Steenburgh and Horel
- SUNY Albany – PI's Torn and Bosart
- Florida St University – PI's Fuelberg and Hart
- University of Washington – PI's Mass and Hakim



# Ongoing CSTAR Awards

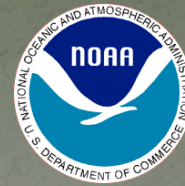


## 6 Projects awarded from FY14 FFO

- Penn State University – PI's Mejia and Duffy
- NC State University – PI's Parker, Lackmann, and Xie
- Florida Inst. of Tech. – PI's Lazarus and Weaver
- Penn State University – PI's Markowski and Richardson
- Iowa State University – PI's Gallus and Franz
- Texas Tech University – PI's Ancell and Weiss



# CSTAR Outreach and R2O Examples



- Webinars with NWS Forecasters: NC STATE
- Training Modules: SUNY Albany
- Publications: University of Washington
- Research cited in AFD's: SUNY StonyBrook Ensemble Sensitivity
- Encourage use of NWS V-Lab



# R2O Initiative



- New program aims to accelerate research into operations
- Focus on demonstrating modeling research, forecast tools, and improved software
- To support 23 projects; begin May 2015
- 14 are specific to modeling research/development
- 9 focus on NOAA testbed-related activities
- Total funding: approx. \$4.2M/year
- Each proposal: \$250K/year up to 2 years.



# Testbed-Related R2O Projects



## “Validation of Significant Weather Features and Processes in Operational Models Using a Cyclone Relative Approach”

- SUNY SB – PI's Colle and Chang
- 1 May 2015 – 30 April 2017
- Will work with DTC to modify the Model Evaluation Tools (MET) verification software to interface with the extratropical cyclone tracker code and output at EMC.
- Also work with the HMT and OPC to utilize the code in testbeds and experiments.



# Testbed-Related R2O Projects



## “Test and Evaluation of Rapid Post-Processing and Information Extraction From Large Convection Allowing Ensembles Applied to 0-3hr Tornado Outlooks”

- University of Oklahoma – CIMMS ; collaboration with HWT
- PI's: Correia, LaDue, Karstens, Wheatley, Knopfmeier
- 1 May 2015 – 30 April 2017
- utilize an ensemble-based, radar data assimilation system within the HWT to generate hourly and three hourly tornado outlooks.
- first step in achieving full use of rapidly updating, large convection-allowing ensemble systems and making them useful and usable to forecasters while producing consistent and reliable risk analyses in between the warning and watch time scales.



# Testbed-Related R2O Projects



## “Data Mining of High-Resolution Storm-Scale Datasets”

- University of Oklahoma – CIMMS
- PI's: Smith, ?, Karstens, Ortega with NSSL and HWT
- 1 May 2015 – 30 April 2017
- perform pattern recognition and data mining on the Multi-Year Reanalysis of Remotely Sensed Storms (MYRORSS) dataset (radar)
- identify and track storm clusters at multiple horizontal length scales, ranging from individual convective cells to MCS
- Storm classification technique will be employed to create distributions of storm type and lifetime based on environment



# Testbed-Related R2O Projects



## “An Investigation of the Skill of Week Two Extreme Temperature and Precipitation Forecasts”

- SUNY Albany in collaboration with HMT
- PI's: Bosart and Keyser
- 1 May 2015 – 30 April 2017
- Improving temperature and precipitation forecasts in the 8-10 day time range at WPC
- Develop methodology for identifying extreme temperature and precipitation events over the CONUS for all seasons
- perform an evaluation of operational NCEP GFS 8-10 day forecast skill for the extreme events
- Add more to notes



# Testbed-Related R2O Projects



## “Exploitation of Ensemble Prediction System Information in support of Atlantic Tropical Cyclogenesis Prediction”

- SUNY Albany with University of Miami - CIMAS
- PI's: Thorncroft and Dunion collaboration with JHT
- 1 May 2015 – 30 April 2017
- To ensure that recent and current research concerned with the variability of AEW structures and downstream tropical cyclogenesis probability is transferred into operational decision-making at NHC.
- To develop and evaluate tools that exploit key information in dynamical ensemble prediction systems in support of tropical cyclogenesis prediction.



# Testbed-Related R2O Projects



## “Incorporation of Near Real-Time Suomi NPP Green Vegetation Fraction and Land Surface Temperature Data into the NCEP Land Modeling Suite”

- NESDIS and EMC with JCSDA
- 1 May 2015 – 30 April 2017
- PI's: Csiszar, Vargas, Yu, Ek, Wu, and Zheng
- Improve the use of two operational land surface data products derived from the Visible Infrared Imaging Radiometer Suite (VIIRS) on the Suomi National Polar-orbiting Partnership (SNPP) Satellite.



# Testbed-Related R2O Projects

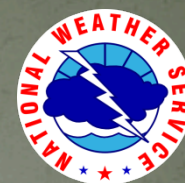


## “Application of a Hybrid Dynamical-Statistical Model for Week 3 to 4 Forecast of Atlantic/Pacific Tropical Storm and Hurricane Activities”

- CPC – Climate Testbed
- PI's: Schemm and Wang
- 1 May 2015 – 30 April 2017
- explore the impact of the MJO cycle on sub-monthly tropical storm and hurricane activities in the Atlantic and North Pacific basins
- develop a dynamical–statistical model for week 3 and week 4 forecasts of Atlantic and North Pacific basin tropical storm activity
- implement this model for operational forecasts for the entire hurricane season with updates on a weekly basis



# Testbed-Related R2O Projects



## “Information Extraction and Verification of Numerical Weather Prediction for Severe Weather Forecasting”

- University of Oklahoma – CIMMS collaboration with HWT EMC and NSSL
- 1 May 2015 – 30 April 2017
- PI's: Jirak, Melick, Brooks, and Pyle
- Refine HWT verification techniques and methods to establish standard scale-appropriate metrics for evaluating NWP forecasts relevant to severe convective weather
- Techniques for extracting hazard-specific information from the models will be developed to provide relevant guidance for SPC and NWS severe weather products and services.



# Testbed-Related R2O Projects



**“Improvement of Convective/Severe Weather Prediction through an Integrative Analysis of WRF Simulations and NEXRAD/GOES Observations over the CONUS”**

- University of North Dakota
- PI's: Dong, Kennedy, and Gilmore; collaboration with HWT and CIMMS
- 1 May 2015 – 30 April 2017
- Will perform detailed evaluations of both deterministic and ensemble suites of convection-permitting simulations
- existing HWT simulations from NSSL and NCEP will be evaluated via objective verification software utilizing NEXRAD reflectivity and Q<sub>2</sub>/Q<sub>3</sub> precipitation products provided by the NSSL.
- development of an ensemble forecasting system for WRF where the current WRF default (WSM6) and numerous other microphysical schemes will be evaluated.

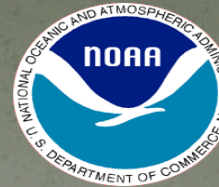


# Next CSTAR Request for Proposals



- Issued during the summer 2 of every 3 years
- Should be in grants.gov in July-August 2015
- Expect approximately 4-6 new projects to be funded
- Request to raise annual funding limit
- Incorporate latest priorities from NWS Regions and NCEP
- Data sharing is now required
- Expect PI's to begin using the NWS VLab CSTAR Community to share research and development work and results





# Contact Information

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CSTAR Awards Page:  
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